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Brief for Appellant
Application No. 09/623,796
Attorney's Docket No. 032326-083

#14/Brief

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Patent
Attorney's Docket No. 032326-083

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

01/28/2004

In re Patent Application of

Philippe PATRICE

Application No.: 09/623,796

Filed: September 8, 2000

For: METHOD FOR MAKING CONTACTLESS CARDS

Group Art Unit: 3729

Examiner: M. Trinh

Appeal No.

BRIEF FOR APPELLANT

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This appeal is from the decision of the Primary Examiner dated June 26, 2003, finally rejecting claims 4-7, which are reproduced in an Appendix to this brief.

A check covering the $330.00 Government fee (1402) and two extra copies of this brief are being filed herewith.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800. A copy of this page and the signature page are submitted in duplicate.

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I. Real Party in Interest

The subject application, and the invention claimed therein, is assigned to Gemplus, a French corporation.

II. Related Appeals and Interferences

There are no other appeals or interferences known to appellant, the appellant's legal representative, or the assignee which will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. Status of Claims

The present application contains claims 1-8, all of which are pending and stand finally rejected. The present appeal is directed to dependent claims 4, 5, 6 and 7. For the sake of completeness, however, all pending claims are reproduced in the accompanying Appendix.

IV. Status of Amendments

An Amendment was filed subsequent to the final Office Action, on October 27, 2003. In this Amendment, the subject matter of claim 4 was incorporated into claim 1, and claims 5, 6 and 7 were rewritten in independent form.

In an Advisory Action dated November 7, 2003, the Examiner refused to enter the Amendment, on the grounds that it raised new issues that would require further consideration and/or search. In the comments accompanying the Advisory Action, the Examiner identified the language, "producing the antenna from a thermoplastic material loaded with particles" and "connecting the chip to the antenna by thermocompression to embed the metallized..." as features which narrow the scope of the claims and would require further search and/or consideration. However, these features were explicitly recited in dependent claim 4 that was previously before the Examiner. Hence, it is not

apparent how the incorporation of these features into claim 1 was considered to raise new issues.

Rather than further contest this point, however, appellant is proceeding with this appeal on the basis of claims 4-7 as they appeared in dependent form prior to submission of the Amendment.

V. Summary of the Invention

The claimed invention is directed to a method for manufacturing a contactless smart card. Such a smart card includes an integrated circuit chip and an antenna. The invention is particularly directed to the connection between the integrated circuit chip and the antenna. Such a connection must provide mechanical strength, to withstand flexure of the card, and should be inexpensive to produce. In addition, the connection should not appreciably increase the thickness of the card. As discussed on pages 2 and 3 of the specification, prior approaches to making the connection did not achieve all of these objectives.

In accordance with the present invention, the integrated circuit chip is directly connected to the antenna by means of metallized protrusions which are embedded in the material of the antenna. Referring to Figures 1a and 1b, the integrated circuit chip 3 has contact pads 4 on one side thereof. Metallized protrusions 5 are formed on the contact pads. An antenna 2 is formed on an insulated substrate 1. During the process of mounting the chip 3 on the substrate, the metallized protrusions 5 become embedded in the thickness of the antenna material 2, as depicted in Figure 1b. (Page 6, line 6 to page 7, line 11).

The application discloses several embodiments of a smart card that can be produced in this manner. In a first embodiment, the antenna 2 is made from a thermoplastic material that is loaded with metallic particles. In this embodiment, the chip 3 is attached to the antenna by means of a hot compression process. The heating softens the thermoplastic material, and the simultaneous compression facilitates the penetration of the protrusions 5 into the thickness of the antenna, to thereby form the connection. Upon subsequent cooling

of the antenna material, the chip becomes adhered thereto. (Page 7, line 12 to page 8, line 14).

In a second embodiment, the antenna 2 is made from a conductive thermosetting polymer material, which is not polymerized before the chip attachment step, so that the material is in a viscous state. The chip 3 is attached by compression, so that the metallized protrusions 5 penetrate into the thickness of the unpolymerized antenna material. Heat is applied to polymerize the antenna material, so that it hardens, and thereby fixes the chip to the antenna. (Page 8, line 15 to page 9, line 2).

In a variation of this embodiment, the antenna 2 is made from a conductive polymer material which has not been dried. The moistness of the polymer material enables the protrusions 5 on the chip 3 to be embedded within its thickness. After the chip has been attached, the antenna material can dry in ambient air, to thereby fix the chip to the antenna. (Page 9, lines 3-13).

A fourth embodiment of the invention is depicted in Figures 2a and 2b. In this embodiment, the antenna can again be made from a thermoplastic material that is loaded with metallic particles. The face of the chip 3 which is opposite the contact pads 4 is glued to an insulating substrate 7. The two substrates 1 and 7 are then hot laminated to one another. The heating softens the thermoplastic material, and the pressing of the two sheets against one another causes the protrusions 5 to penetrate into the antenna material, as depicted in Figure 2b. (Page 10, lines 13-27).

As a result of the manufacturing process of the invention, extremely thin contactless smart cards can be produced. Since the protrusions are embedded in the thickness of the antenna, the resulting structure provides durability against mechanical stresses. Furthermore, the number of steps required to produce the structure is relatively small, thereby resulting in a less expensive process.

VI. The Issues

The final Office Action presents four issues for review on this appeal:

1. The final Office Action contains a rejection of claims 1-8 under the second paragraph of 35 U.S.C. §112. While the separate patentability of claim 1 is not being asserted in this appeal, since dependent claims 4-7 incorporate the subject matter of claim 1, the compliance of claim 1 with the requirements of 35 U.S.C. §112 must be evaluated. Furthermore, if the Board reverses the rejections of any of the appealed claims, it is Appellant's intention to maintain claim 3 as a dependent claim in the application. Accordingly, the compliance of claim 3 with 35 USC §112 should also be determined.

2. Are claims 4 and 5 anticipated by the Moskowitz et al patent, U.S. Patent No. 5,528,222?

3. Are claims 6 and 7 unpatentable over the Moskowitz et al patent, under 35 U.S.C. §103?

4. Are claims 4-7 unpatentable over the Kohama et al patent, U.S. Patent No. 5,856,662, in view of the Moskowitz et al patent?

VII. Grouping of Claims

Appellant does not consider claims 4-7 to stand or fall together. Rather, as presented below, each of claims 4, 5, 6 and 7 present separate issues of patentability.

VIII. Argument

A. The Claims Comply With The Requirements Of 35 U.S.C. §112

1. Claim 1

Claims 1-8 were rejected under the second paragraph of 35 U.S.C. §112, as allegedly being indefinite. With respect to claim 1, the Office Action states:

> It is not clear how the embedding the metallised protrusions (claim 1, lines 4-5) can be successfully done for the following reasons: a) if the density of the antenna is being greater (or harder) than the associated material of the metallised protrusions, and b) it is also not known how the

> embedding can be done if the thickness of the antenna is being less than the height of the metallised protrusions, and what actually holding and simultaneously pushing the metallised protrusions to cause them to embed in the antenna thickness. Therefore the "embedding step" is considered to be incomplete. For example: the steps of "providing the metallised protrusions with a thickness less than the thickness of the antenna, etc.," (see specification page 6 lines 24-30) should be added to the claims language to clearly define the subject matter of the invention in which applicant(s) regard to. Further, applicants should carefully revise the claims to positively recite the manufacturing method steps.[1]

First, with respect to the statement that it is not clear "how" the embedding is performed, the relevant case law clearly states that it is not the function of the claims to teach how to make or use the invention. Rather, that is the function of the specification. See, for example, *In re Johnson & Farnham*, 194 USPQ 187 (CCPA 1977) ("One does not look to claims to find out how to practice the invention they define, but to the specification"), and *Smith & Nephew, Inc. v. Ethicon, Inc.*, 61 USPQ2d 1065 (Fed. Cir. 2001) ("A claim is not defective when it states fewer than all of the steps that may be performed in practice of an invention"). The function of the claims is to define the metes and bounds of the invention. Applicant is entitled to claim the inventive concept as broadly as the prior art permits, and §112 does not require that the claim recite all of the details that may be necessary to implement that concept.

Second, the disclosure and claims are directed to those having an ordinary level of skill in the art. See, for example, MPEP §2173.02. A person having an ordinary level of skill in the manufacture of smart cards would understand what the relative densities of two materials need to be, if one of them is to be embedded in the other. Hence, it is not necessary to spell out this type of detail in the claims. Furthermore, the claims on appeal, namely claims 4-7, recite features that enable the embedding to be accomplished. For instance, claim 4 recites that the antenna is produced from a thermoplastic material, and the

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[1] Final Office Action dated June 26, 2003, page 2, paragraph 3(i).

chip is connected by thermocompression. Since the thermocompression process applies heat to the materials, the thermoplastic material will be softened, to enable the metallized protrusions to be embedded therein. In the same manner, the hot lamination step of claim 7 causes softening of the thermoplastic material.

Along similar lines, claim 5 recites that the antenna is produced from a "non-polymerized" material, and claim 6 recites that the antenna is produced from a "moist" polymer material. Thus, each of the claims on appeal recites sufficient information about the antenna material that would enable embedding of the metallized protrusions to occur.

Third, the height of the antenna does not have to be greater than or equal to that of the protrusions, in order for the invention to work. While the specification discloses that such a situation is "preferable," it is not an absolute requirement. The antenna only has to have sufficient thickness to hold the protrusions; it does not have to totally envelop the embedded protrusions to achieve such a result. In this regard, note that each of Figures 1b and 2b depicts a small space between the surface of the IC chip 3 and the surface of the antenna 2, suggesting that the protrusions 5 can be thicker than the antenna layer.

The purpose of the definiteness requirement in §112 is to give fair warning to persons in the art as to what will constitute infringement of the patent. *United Carbon Co. v. Binney Co.*, 317 U.S. 228 (1942). In the present case, a person of ordinary skill in the art can readily determine whether a process for making a contactless smart card causes metal protrusions on an integrated circuit chip to be embedded within the thickness of an antenna material. If so, the process falls within the scope of the claim. It is not necessary for the claims to recite anything more in order to make this determination. Accordingly, the claims comply with the definiteness requirement of 35 U.S.C. §112, second paragraph.

2. Claim 3

With specific reference to claim 3, the Office Action states that the term "form factor" is not clear. Again, however, a person of ordinary skill in the manufacture of products, particularly smart cards, would understand the meaning of this term, namely the

size and shape of an article. See, for example, *The Dictionary of Computer and Internet Terms*, 7th Ed., p. 189, which was submitted with the Amendment filed October 27, 2003. In the present case, the form factor for a smart card is a well-defined standard, set forth in ISO 7816-1, which references ISO 7810. Copies of the pertinent pages of these two standards were included with the above-noted Amendment. As can be seen, they define the size and shape of an integrated circuit card, i.e., a smart card. Accordingly, it is submitted that a person skilled in the field of smart card technology would readily understand the meaning of the claim recitation of "form factor."

B. Claims 4-7 Are Neither Anticipated Nor Suggested By The Cited References

1. Claim 4

Claim 4 was rejected under 35 U.S.C. §102, as allegedly being anticipated by the Moskowitz et al patent. This claim depends from claim 1. Claim 1 recites a method of manufacturing a contactless smart card including an integrated circuit chip and an antenna. The first step of claim 1 is that of producing metallized protrusions on two contact pads on the chip. Claim 1 recites the further step of connecting the chip to the antenna by embedding the metallized protrusions in the thickness of the antenna at the time that the chip is connected to the antenna.

Claim 4 adds the recitations that the antenna is produced from a thermoplastic material loaded with metallic particles, and that the chip is connected to the antenna by thermocompression.

At the outset, it is to be noted that the Moskowitz et al patent cannot anticipate claim 4 because it fails to disclose the step of "embedding the metallized protrusions in a thickness of the antenna" as recited in parent claim 1. A person of ordinary skill understands that to "embed" one thing in something else means to "place or fix firmly in surrounding matter." See, for example, the definition of "embed" appearing in *Webster's New Collegiate Dictionary*, a copy of which was provided with the Amendment cited previously. As shown in Figures 1b and 2b of the present application, the metal

protrusions 5 are disposed within the plane of the antenna layer 2, i.e., the antenna material surrounds the metal protrusions.

The Moskowitz et al patent does not disclose such an arrangement. Rather, as can be clearly seen in Figure 2 of the Moskowitz et al patent, the solder bumps 225 on the contacts 222 are disposed *above* the antenna layer 230, and not "in" the material of the antenna. In other words, the antenna material does not surround the solder bumps. The same holds true for the embodiment of Figure 3. A person of ordinary skill would not consider this type of arrangement to be an "embedding" of the solder bumps in the antenna material. The characterization of the disclosed structure as such in the final Office Action ignores the plain and ordinary meaning of the term.

In addition to this distinction, claim 4 recites that the antenna is produced from a thermoplastic material loaded with metallic particles. The rejection of claim 4 references the prior Office Action dated January 31, 2003, at paragraph 5. With respect to claim 4, that Office Action stated "Moskowitz et al teach that the antenna is produced by an associated process including thermocompression (see column 6, lines 1-5)." However, the rejection overlooks the fact that the Moskowitz et al patent does not teach the use of a *thermoplastic material* for the antenna, particularly for the purpose of embedding protrusions on the chip into such material by thermocompression. Rather, Moskowitz et al teaches that the antenna 230 is made of copper. See column 4, lines 5-8. The Office Action has not identified any teaching in the Moskowitz et al patent which would lead one of ordinary skill in the art to utilize a thermoplastic material for the antenna. For this additional reason, therefore, the Moskowitz et al patent does not anticipate claim 4 under 35 U.S.C. §102.

Claim 4 was also rejected under 35 U.S.C. §103, as being unpatentable over the Kohama patent in view of the Moskowitz et al patent. The rejection acknowledges that the Kohama patent does not teach an antenna formed from a thermoplastic material with metallic particles. It goes on to state, however, that a thermoplastic material with metallic particles "is old and well known in the art." The rejection then concludes that it would

have been obvious at the time the invention was made "to employ the teachings of thermo plastic material. . . to method invention of Kohama et al in order to form a low profile contact less card device...."[2]

As set forth in MPEP §2143, three basic criteria must be met to establish a *prima facie* case of obviousness. One of these criteria is that "the prior art reference (or references when combined) must teach or suggest *all* the claim limitations" (emphasis added). The rejection based upon the Kohama and Moskowitz et al patents fails to meet this criterion. As acknowledged in the Office Action, the Kohama patent does not teach an antenna made from a thermoplastic material with metallic particles. Furthermore, as discussed previously, the Moskowitz et al patent does not teach this claimed feature. Apparently recognizing this deficiency in each of the references, the rejection simply relies upon the allegation that thermoplastic material with metallic particles "is old and well known in the art." However, it does not provide any citation to a reference that supports this statement. Thus, the Examiner has failed to meet his burden for establishing a *prima facie* case of obviousness.

Furthermore, even if it is assumed that the statement is true, namely that thermoplastic materials with metallic particles, per se, are known in the art, this fact by itself does not render the claimed subject matter obvious. There has been no showing, nor even an allegation, that the use of a thermoplastic material with metallic particles to form an antenna in a contactless smart card is known in the art. Nor has there been any showing that it was known to employ thermocompression in combination with such a material for the purpose of embedding contact protrusions within the antenna. Although the Moskowitz et al patent discloses the use of thermocompression, that disclosure is only made in the context of copper as the antenna material, and does not result in the embedding of the solder bumps within such material. Accordingly, the rejection does not establish a *prima facie* case of obviousness, for at least the reason that it fails to identify where all of the claim limitations are taught or suggested in the prior art.

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[2] Final Office Action at page 5.

2. Claim 5

Claim 5 depends from claim 1, and recites that the antenna is produced from a non-polyermized conductive material and that the chip is connected to the antenna by compression. The claim recites the further step of polymerizing the antenna material by applying heat.

Claim 5 was rejected on the same basis as claim 4, namely with reference to the fact that the Moskowitz et al patent discloses the use of thermocompression. The rejection does not address the specific features recited in claim 5, namely the use of a non-polymerized conductive material to form the antenna, which is polymerized after the embedding step by applying heat. Nor are these features disclosed in the Moskowitz et al patent. As discussed previously in connection with claim 4, that patent only discloses the use of copper as the material for the antenna. Consequently, the Moskowitz et al patent does not anticipate claim 5.

Claim 5 was also rejected under 35 U.S.C. §103 as being unpatentable over the Kohama patent in view of the Moskowitz et al patent. The rejection of this claim was lumped with that of claim 4, which, as discussed above, is based on the allegation that thermoplastic material with metallic particles is well known in the art. The rejection does not even acknowledge that claim 5 recites a different material for the antenna, namely a non-polymerized conductive material that is subsequently polymerized with the application of heat. In the case of claim 5, there is not even an allegation that the use of a non-polymerized material for the antenna is known in the art, much less a showing of such. Consequently, the Office Action has again failed to establish a *prima facie* case of obviousness against claim 5.

3. Claim 6

Claim 6 depends from claim 1, and recites that the antenna is produced from a moist conductive polymer material. This claim was rejected under 35 U.S.C. §103, as being unpatentable over the Moskowitz et al patent. This claim was also rejected under 35

U.S.C. §103 as being unpatentable over the Kohama patent in view of the Moskowitz et al patent. In both rejections, the Office Action implicitly acknowledges that the references do not teach the use of a moist conductive polymer material for the antenna. The rejection goes on to dismiss this lack of teaching in the references with the statement:

> It would have been an obvious matter of design choice to choose any desired material and its characteristic properties, i.e., a moist conductor polymer, etc., since applicant has not disclosed that the exact material . . . would solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the same type of material as suggested by the applied art references.[3]

For the same reasons as presented previously, the Office Action fails to establish a *prima facie* case of obviousness. First, it implicitly acknowledges that the use of a moist conductive polymer material to form an antenna on a smart card is not suggested by the references. Further, it does not even allege that such a material is known in the prior art. Rather, it relies upon the conclusion that it would be obvious to choose *any* desired material, on the grounds that the applicant has not disclosed that the claimed material "would solve any stated problem or is for any particular purpose. . . ." In fact, this is not the case. The reason that applicant has disclosed and claimed the use of a moist conductive polymer material is because it is one material that facilitates the claimed result, namely it enables the metallic protrusions to be embedded within the thickness of the antenna. The recited material has a specific purpose within the context of the claimed method, and the cited references do not provide a teaching of materials for accomplishing this purpose, particularly a moist conductive polymer material.

Finally, the last statement in the above-quoted sentence utilizes hindsight and reverse analysis to support the rejection. Specifically, the Office Action states that the "invention" would perform equally well with the same type of material "as suggested by the applied art references." The issue, however, is not whether the *invention* can be modified

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[3]Final Office Action at page 5, first full paragraph.

in light of the prior art. Rather, patentability hinges upon whether there is any teaching to modify the *prior art* to arrive at the claimed invention.

In summary, there is no teaching in either the Moskowitz et al patent or the Kohama patent, or any combination thereof, that would lead a person of ordinary skill to use a moist conductive polymer material to form the antenna in a contactless smart card, so that metallic protrusions on an integrated circuit chip will become embedded within the thickness of the antenna when the chip is connected to the antenna. The Office Action fails to establish a *prima facie* case of obviousness.

4. Claim 7

Claim 7 depends from claim 1, and recites that the antenna is produced from a thermoplastic material loaded with metallic particles. For at least the reasons presented previously in connection with claim 4, therefore, the subject matter of this claim is not suggested by the references.

In addition, claim 7 recites that the chip is glued to an insulating sheet having the form factor of a smart card, and is connected to the antenna by hot lamination. These further features of claim 7 are not addressed in either of the rejections of the claim (based upon the Moskowitz et al patent alone, or the combination of the Kohama and Moskowitz et al patents). Furthermore, neither of the references discloses these claimed features. For instance, with reference to exemplary Figure 2 of the Moskowitz patent, it can be seen that the chip 210 is connected to the antenna 230 prior to lamination of the substrates 270. In other words, the connecting of the chip to the antenna is not "effected by hot lamination" as recited in claim 7. Similarly, with reference to Figures 25 and 26 of the Kohama patent, the chip 11 is mounted on the antenna 81 by means of a press plate 33. There is no teaching that the chip is glued to an insulating substrate.

For these additional reasons, therefore, the subject matter of claim 7 is not suggested by either of the references. Accordingly, the Office Action has failed to establish a *prima facie* case of obviousness.

IX. Conclusion

From the foregoing, it can be appreciated that the Moskowitz et al and Kohama patents do not disclose, nor otherwise suggest, the subject matter recited in each of claims 4-7, whether considered individually or in combination. The rejections of these claims are not properly founded in the statute, and should be reversed.

Respectfully submitted,

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APPENDIX A

The Appealed Claims

1. A method of manufacturing a contactless smart card including an integrated-circuit chip and an antenna, comprising: producing metallised protrusions on two contact pads on the chip, said method including the step of connecting the chip to the antenna by embedding the metallised protrusions in a thickness of the antenna, at the time that the chip is connected to the antenna.

2. The method according to Claim 1, comprising producing the antenna from a material having a viscous state at the time that the chip is attached, to allow the embedding of the metallised protrusions.

3. The method according to claim 1, comprising producing the antenna on an insulating substrate having a form factor of the smart card.

4. The method according to claim 1, comprising producing the antenna from a thermoplastic material loaded with metallic particles and connecting the chip to the antenna by thermocompression.

5. The method according to claim 1, comprising producing the antenna from a non-polymerised conductive material and connecting the chip to the antenna by compression, and further including the step of polymerizing the antenna material by applying heat.

6. The method according to claim 1, comprising producing the antenna from a moist conductive polymer material, and connecting the chip to the antenna by compression.

7. The method according to claim 1, comprising producing the antenna from a thermoplastic material loaded with metallic particles and gluing the chip to an insulating sheet having the form factor of a smart card, and wherein the connecting of the chip to the antenna is effected by hot lamination.

8. The method according to claim 1, wherein the metallised protrusions have a substantially conical shape.